

II. REMARKS

As an initial matter, Applicants renew their traversal of the Examiner's Restriction Requirement, outlined in the Office Action of July 12, 2007, for the reasons evinced in Reply (B), filed August 13, 2007, which is incorporated herein by reference. Furthermore, Applicants gratefully acknowledge the Examiner's determination that all generic claims and linking claims will be rejoined with allowed generic or linking claims (Office Action, dated September 25, 2007, at 2, lines 10-13).

Claims 2, 3, 6-11 and 14 have been withdrawn, and claims 1, 4, 5, 12, 13 and 15 have been examined.

By the present amendment, claim 1 been amended to recite

“a driven gear disposed on both sides or one side of the drum-shaped tool; and a main driving gear disposed to drive the driven gear, wherein the driven gear and the main driving gear are disposed within the tool body and the main driving gear is rotationally driven by a belt provided within the tool body”

as supported by Figure 5, and on page 17, lines 1-16, of Applicants' disclosure as originally filed, and as supported by previous claim 12.

Claim 12 depends on claim 1, and has been amended in accordance with the amendment to claim 1.

The present amendment adds no new matter to the above-captioned application.

A. The Invention

The invention pertains broadly to a free curved surface precision machining tool for precision-machining a surface to be machined, such as may be used to machine a surface. In accordance with an embodiment of the present invention, a free curved surface precision machining tool for precision-machining a surface to be machined is provided that includes the features recited by independent claim 1. Various other embodiments, in accordance with the present invention, are recited by the dependent claims.

An advantage provided by the various embodiments, in accordance with the present invention, is that a free curved surface precision machining tool for precision-machining a surface is provided that is capable of precision machining a free curved surface using a versatile 3-axis (x, z, r) NC machining apparatus.

B. The Rejections

Claims 1 and 4 stand rejected under 35 U.S.C. § 102(b) as anticipated by Hess et al. (U.S. Patent 4,958,463, hereafter the “Hess Patent”).

Claims 5, 13 and 15 stand rejected under 35 U.S.C. § 103(a) as unpatentable over the Hess Patent in view of Ohmori et al. (U.S. Patent 6,056,629, hereafter the “Ohmori Patent”). Claim 12 stands rejected under 35 U.S.C. § 103(a) as unpatentable over the Hess Patent in view of Nisimura (U.S. Patent 3,953,942, hereafter the “Nisimura Patent”).

Applicants respectfully traverse the Examiner’s rejections and request reconsideration of the above-captioned application for the following reasons.

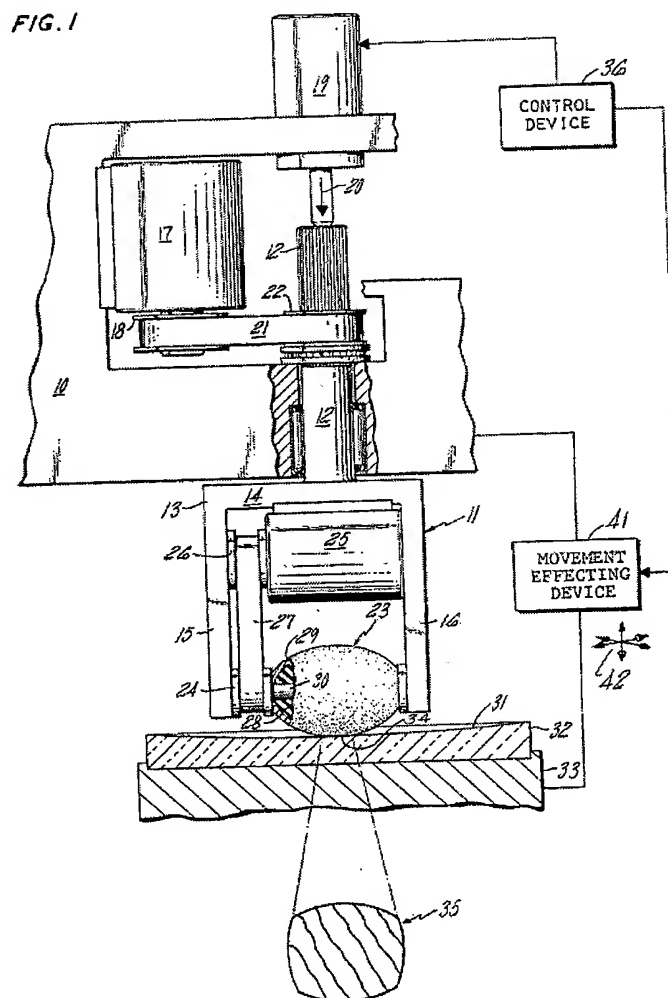
C. Applicants’ Arguments

i. The Section 102(b) Rejection

Anticipation under 35 U.S.C. § 102 requires showing the presence in a single prior art reference disclosure of each and every element of the claimed invention, arranged as in the claim. Lindemann Maschinenfabrik GMBH v. American Hoist & Derrick, 221 U.S.P.Q. 481, 485 (Fed. Cir. 1984). In this case, the Examiner has not established a prima facie case of anticipation against Applicants’ claimed invention because the Hess Patent does not teach, or suggest, each and every element of the claimed invention arranged as in the claims.

ii. The Hess Patent

The Hess Patent discloses an “optical surface quality improving arrangement” as shown in Figure 1, reproduced below for convenience, which includes a mounting member (11) mounted on a support (10) for movement relative thereto at least in and opposite to a predetermined direction toward and away from the effective surface and a working member (23) that is caused to rotate relative to the mounting member (11) about a rotational axis that extends substantially normal to the predetermined direction (See Abstract of the Hess Patent).



A pressing force acting in the predetermined direction is applied to the mounting member (11) according to the Hess Patent so that successive regions of an outer circumferential surface of the working member (23), which is centered on the rotational axis, act on a

predetermined zone of the effective surface (31) of the workpiece (32) during the rotation of the working member (23) with local pressures dependent on the magnitude of the pressing force and sufficient to remove material from the workpiece (32), (See Abstract of the Hess Patent). The Hess Patent discloses that the predetermined zone is caused to move over the effective surface, and at least one of the pressing force and the rate of such movement is so controlled that the material of the workpiece is removed from any area of the effective surface while the successive regions of the outer circumferential surface of the working member act thereon to such a depth that the effective surface obtains its desired configuration (See Abstract of the Hess Patent).

However, as admitted by the Examiner (Office Action, dated February 13, 2008, at 4, lines 5-9), the Hess Patent does not teach, or even suggest, (i) “a driven gear disposed on both sides or one side of the drum-shaped tool,” (ii) “a main driving gear disposed to drive the driven gear,” and (iii) “wherein the driven gear and the main driving gear are disposed within the tool body and the main driving gear is rotationally driven by a belt provided within the tool body” as recited by claim 1.

For all of the above reasons, the Hess Patent cannot anticipate the subject matter of independent claim 1.

iii. The Section 103 Rejection

A prima facie case of obviousness requires a showing that the scope and content of the prior art teaches each and every element of the claimed invention, and that the prior art provides some teaching, suggestion or motivation, or other reason, for combining the references in the manner claimed. KSR International Co. v. Teleflex Inc., 127 S.Ct. 1727, 1739-41 (2007); In re Oetiker, 24 U.S.P.Q.2d 1443 (Fed. Cir. 1992). In this case, the Examiner has failed to establish a prima facie case of obviousness because the Examiner has not shown

that the combination of the Hess Patent, the Ohmori Patent and the Nisimura Patent teach each and every element of the claimed invention arranged as in the claims.

iv. The Hess Patent

The disclosure of the Hess Patent has been discussed above. Furthermore, as admitted by the Examiner (Office Action, dated February 13, 2008, at 3, lines 18-21), the Hess Patent does not teach, or suggest, (iv) “the grindstone that includes a metal in a bonding material of the grindstone” as recited by claim 5, and (v) “correction means” as recited by claim 13.

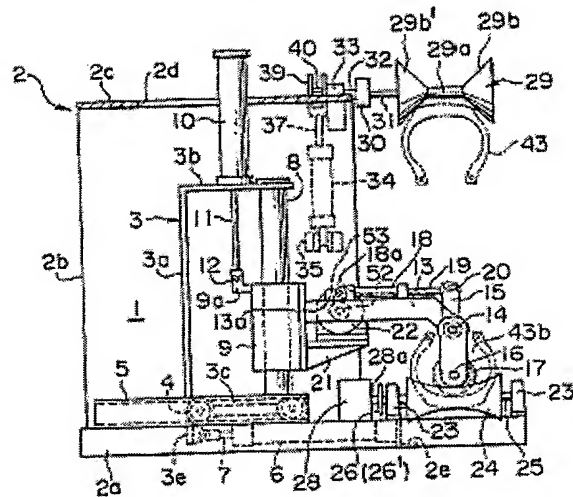
v. The Ohmori Patent

The Ohmori Patent discloses a “free form machining tool” (10) as shown in Figure 2 that includes a spherical tool (12) that has a spherical surface machining section (13a) that is a grinder including a metal as its bonding material (col. 3, lines 35-42).

vi. The Nisimura Patent

The Nisimura Patent discloses an “apparatus for grinding inner surface of a vehicle tire” that is used to grind the inner surface of a vehicle tire together with a mold releasing agent for amending an unbalanced portion on the tire and scars on the inner surface of the tire (See Abstract of the Nisimura Patent). The Nisimura Patent illustrates the apparatus for grinding an inner surface of a vehicle tire (43) in Figure 1, which is reproduced below.

FIG. 1

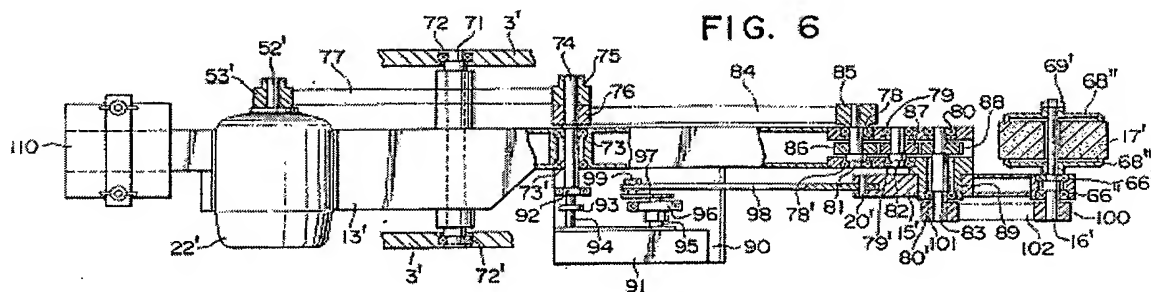


The Nisimura Patent discloses that the apparatus in Figure 1 comprises a frame structure (2), a horizontal supporting member (13) mounted on the frame structure (2), a swing member (15) pivotally mounted on the forward end portion of the supporting member (13), a grinder wheel (17) rotatably mounted on the lower end portion of the swing member (15), a swing member swinging mechanism (18, 19) mounted on the supporting member (13) for swinging the swing member (15) about its own axis, a grinder wheel rotating mechanism (See Figures 3 and 4) mounted on the supporting member (13) and the swing member (15) for rotating the grinder wheel (17), a tire rotating mechanism (24, 25, 28) mounted on the frame structure (2) opposing to the grinder wheel (17) for holding and rotating the vehicle tire (43) at a predetermined peripheral speed, a grinder wheel moving mechanism (3, 6, 7) mounted on the frame structure (2) for relatively moving the supporting member (13) and the tire rotating mechanism (24, 25, 28) to move the grinder wheel (17) toward or away from the inner surface of the vehicle tire (43) on the tire rotating mechanism (See Abstract of the Nisimura Patent, and col. 3, line 37, to col. 6, line 39).

The Nisimura Patent does not teach, or even suggest, (i) “by rotation around a vertical axis z of a tool body of the precision machining tool” as recited by the preamble of

independent claim 1. The Nisimura Patent also does not teach, or suggest, (ii) “an orthogonal axis x orthogonal to the vertical axis z of the tool body” and (iii) “the drum-shaped tool has a convex machining surface in the form of an arcuate rotary body obtained by rotating an arc of radius r with the center of the arc at the intersection O between the vertical axis z and the orthogonal axis x around the orthogonal axis x” as recited by independent claim 1. As admitted by the Examiner (Office Action, dated September 25, 2007, at 4, lines 2-5), the Nisimura Patent also does not teach, or suggest, (iv) that “the grindstone that includes a metal in a bonding material of the grindstone” as recited by claim 5, and (v) “correction means” as recited by claim 13.

While the Examiner contends that Figure 6 of the Nisimura discloses certain limitations of Applicants’ claimed invention (Office Action, dated February 13, 2008, at 4, lines 9-14), Applicants point out that the mechanism shown in this figure pertains to the “driving connection” between electric motor (22’) and the grinder wheel (17’). Figure 6 of the Nisimura Patent is reproduced below for the Examiner’s convenience. The Nisimura Patent discloses, at col. 8, line 24, to col. 9, line 7, that pulley (53’) is connected to pulley



(75) via belt (77), and that pulley (76), disposed on shaft (74) with pulley (75), is connected to pulley (85) via belt (84). The Nisimura Patent discloses that pulley (85) is mounted on shaft (81), which transmits torque to gears (86), (87), (88), which transmit torque to shaft (83) and pulley (101). The Nishimura Patent discloses that pulley (101) is connected to pulley (100) via belt (102) so as to rotate shaft (16’) and grinder wheel (17’), (col. 9, lines 3-12).

However, the Nisimura Patent does not teach, or suggest, (vi) “the driven gear and the main driving gear are disposed within the tool body” and (vii) “the main driving gear is rotationally driven by a belt provided within the tool body” as recited by independent claim 1.

vii. Summary of the Disclosures

The Hess Patent discloses an optical surface quality improving arrangement that, as admitted by the Examiner, does not include (i) “a driven gear disposed on both sides or one side of the drum-shaped tool,” (ii) “a main driving gear disposed to drive the driven gear,” and (iii) “wherein the driven gear and the main driving gear are disposed within the tool body and the main driving gear is rotationally driven by a belt provided within the tool body” as recited by claim 1.

The Ohmori Patent discloses a free form machining tool that includes a spherical tool having a spherical surface machining section that is a grinder that includes a metal as its bonding material

The Nisimura Patent discloses an apparatus for grinding an inner surface of a vehicle tire that includes a drive mechanism connecting an electric motor to a grinder wheel so that torque generated by the electric motor is used to rotate the grinder wheel. However, the Nisimura Patent does not teach, or suggest, “the driven gear and the main driving gear are disposed within the tool body” and “the main driving gear is rotationally driven by a belt provided within the tool body” as recited by independent claim 1.

Thus, the combination of the Hess Patent, the Ohmori Patent and the Nisimura Patent still fails to teach, or suggest, “the driven gear and the main driving gear are disposed within the tool body” and “the main driving gear is rotationally driven by a belt provided within the tool body” as recited by independent claim 1. For all of the above reasons, the Examiner has

failed to establish a prima facie case of obviousness against the claims of the above-captioned application.

III. CONCLUSION

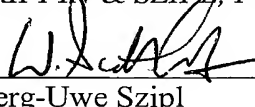
The Examiner has not demonstrated a prima facie case of anticipation with respect to claims 1, 4, 5, 12, 13 and 15 of the present application because, as conceded by the Examiner, the Hess Patent does not teach, or suggest, (i) “a driven gear disposed on both sides or one side of the drum-shaped tool,” (ii) “a main driving gear disposed to drive the driven gear,” and (iii) “wherein the driven gear and the main driving gear are disposed within the tool body and the main driving gear is rotationally driven by a belt provided within the tool body” as recited by claim 1. Furthermore, the Examiner has failed to establish a prima facie case of obviousness under 35 U.S.C. § 103(a) because neither the Hess Patent, the Ohmori Patent nor the Nisimura Patent teach or suggest, either alone or in combination, (i) “the driven gear and the main driving gear are disposed within the tool body” and “the main driving gear is rotationally driven by a belt provided within the tool body” as recited by independent claim 1.

For all of the above reasons, claims 1, 4, 5, 12, 13 and 15 are in condition for allowance, and a prompt notice of allowance is earnestly solicited.

Questions are welcomed by the below-signed attorney for Applicants.

Respectfully submitted,

GRIFFIN & SZIPL, P.C.

for  *Reg # 47,395*
Joerg-Uwe Szipl
Registration No. 31,799

GRIFFIN & SZIPL, P.C.
Suite PH-1
2300 Ninth Street, South
Arlington, VA 22204

Telephone: (703) 979-5700
Facsimile: (703) 979-7429
Email: gands@szipl.com
Customer No.: 24203